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| 09/161,196 | 09/25/1998 | FRANK HINTERMAIER | GR-97-P-2734 | 7324 |

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EXAMINER

NGUYEN, CUONG QUANG

| ART UNIT | PAPER NUMBER |
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2811

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Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 1

Application Number: 09/161,196
Filing Date: September 25, 1998
Appellant(s): Frank Hintermaier

Markus Nolf
For Appellant

MAILED

MAR 11 2003

GROUP 2800

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 0-27-03.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) *Status of Claims*

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The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Claim 1 is independent. Claims 3, 5 and 7-12 depend on claim 1 and they stand or fall with claim 1.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

✓ 5,566,045

Summerfelt

Oct. 15, 1996

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| | | |
|-------------|-------------------|---------------|
| ✓ 5,691,219 | Kawakubo et al. | Nov. 25, 1997 |
| ✓ 6,015,997 | Hu et al. | Jan. 18, 2000 |
| ✓ 5,705,685 | Lyons et al. | Jan. 6, 1998 |
| ✓ 5,990,348 | Lyons et al. | Nov. 23, 1999 |
| ✓ 6,043,184 | Karmakar | Mar. 28, 2000 |
| ✓ 6,060,419 | Wijesekera et al. | May. 9, 2000 |

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Summerfelt et al. (US 5,566,045).

Regarding claims 1, 7, 8, 9, Summerfelt et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (30); a first electrode (34, a platinum group materials. See Summerfelt et al.'s col.10) connected to

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a doped region (44), capacitor dielectric layer (38, a BST layer with a dielectric constant greater than 100. See Summerfelt et al.'s col.11) formed on the first electrode; a barrier layer (52, a GaAs layer. See Summerfelt et al.'s col.13) which is a compound of a transition element (Ga) and As formed below the capacitor dielectric layer; a second electrode formed on the capacitor dielectric layer. See Summerfelt et al.'s Fig.12.

Claims 1, 3-5, and 7-12 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawakubo et al. (US 5,691,219).

Regarding claims 1, 3, 7, 8, 9, 10, 11, Kawakubo et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (1) having a doped region (6b) therein; a first electrode (13, a platinum alloy) connected to the doped region through a connection structure (11, a phosphorus-doped polysilicon layer. See Kawakubo et al.'s col.7 lines 39-43); a capacitor dielectric layer (14, a BST layer with a dielectric constant greater than 100. See Kawakubo et al.'s col.8 lines 5-8) formed on the first electrode; a barrier layer (12, a layer of transition metal such as Ti or Ta. See Kawakubo et al.'s col.7 lines 55-60) formed below the capacitor dielectric layer; a second electrode (14) formed on the capacitor dielectric layer. See Kawakubo et al.'s Fig.4E.

Kawakubo et al. does not explicitly teach that the barrier is a compound of a transition element and phosphorus as the barrier; however, this barrier layer is taken to

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be inherently present in Kawakubo et al. for the following reasons: the transition element layer (12, a layer of Ti or Ta) will react with phosphorus from the connection structure (11, a polysilicon layer containing phosphorous) forming a barrier material such as a TiP or TaP. The US60115997 patent which teaches that "certain Group VB nonmetal elements such as: N, P, As, and Sb, can react with titanium to form barrier materials (e.g., TiN, TiP, TiAs, and TiSb)" provides proof for Ti or Ta will react with phosphorus in polysilicon to form TiP or TaP barrier layer in Kawakubo et al. See US6011997's col.7 lines 50-60.

Regarding claims 4-5, as shown in Fig.4E, the barrier layer is disposed directly underneath the first electrode, covers entire an interface between the first electrode and the connection structure and covers entire an interface between the first electrode and the capacitor dielectric.

Regarding claim 12, Kawakubo et al. teaches that the capacitor connected to a selection transistor through the doped region (6b). See Fig.4E.

(11) Response to Argument

Applicants argue that US 705,685 is in a field of "telephony" which is different than the field of the present invention, so it can not be used as a reference against the present invention. In response, US 705,685 is used to support the fact that gallium is a transitional element. This chemical fact is true for all fields and not just true only in telephony filed.

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Applicants argue that in the expression "X is a group IIB, IVB, VB, VIB or transition element, such as phosphorus, silicon, gallium, aluminum, arsenic, germanium, boron, cobalt, cerium, praseodymium, uranium and thorium", the list "phosphorus, silicon, gallium, aluminum, arsenic, germanium, boron, cobalt, cerium, praseodymium, uranium and thorium" refers to groups IIB, IVB, VB, VIB and transition element, but not transition metals alone, so gallium is not a transition element. In response, in PERIODIC TABLE OF ELEMENTS, groups IIB, IVB, VB, VIB do not contain gallium, so gallium has to be a transition element.

Applicants argue that the word "can" in the expression "Certain Group VB nonmetal elements, such as: N, P, As, and Sb can react with titanium to form barrier material (e.g., TiN, TiP, TiAs, and TiSb)" in US6015997's col.7 lines 55-57 is not absolute or certain. Therefore, it is not inherent that the transition metal layer will react with phosphorous from the connection structure. In response, the definition of word "can" according to Webster's dictionary is "to be able to do, make, or accomplish"; none of these meanings means "not absolute" or "not certain" as alleged by Applicant. Therefore, according to the teaching of US6015997, the transition metal layer (12) in Kawakubo et al. will react with phosphorous from the connection structure to form a barrier material layer of TiP or TaP as claimed.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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March 18, 2003

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